

***Acacia* miscellany 18. The taxonomy of miscellaneous species with sharply pungent phyllodes in *Acacia* section *Plurinerves* (Leguminosae: Mimosoideae)**

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Abstract

Cowan, R.S. and Maslin, B.R. *Acacia* miscellany 18. The taxonomy of miscellaneous species with sharply pungent phyllodes in *Acacia* section *Plurinerves* (Leguminosae: Mimosoideae). *Nuytsia* 12 (3): 453–467 (1999). Several new taxa are proposed in this paper: *A. cavealis* R.S. Cowan & Maslin, *A. chapmanii* R.S. Cowan & Maslin with two subspecies (subsp. *chapmanii* and subsp. *australis* R.S. Cowan & Maslin), *A. donaldsonii* R.S. Cowan & Maslin, *A. formidabilis* C.A. Gardner ex R.S. Cowan & Maslin, *A. latipes* subsp. *licina* R.S. Cowan & Maslin and *A. speckii* R.S. Cowan & Maslin. *Acacia havilandiorum* Maiden and *A. nyssophylla* F. Muell. are lectotypified and the typification of *A. colletioides* Benth. is discussed. Notes on *A. latipes* Benth. and its very close relative, *A. cochlearis* (Labill.) H. Wendl., are presented along with a key to these two species and another closely related species-pair, *A. adnata* F. Muell. and *A. comans* W. Fitzg. These four species comprise the informal 'A. latipes group'.

Introduction

This paper continues the series of contributions to publish notes on various matters that have arisen in the course of our preparation of the account of *Acacia* Mill. (Leguminosae: Mimosoideae) for the "Flora of Australia". Here we describe as new seven miscellaneous taxa with sharply pungent phyllodes of the section *Plurinerves* (Benth.) C. Moore & Betche from southern and central Western Australia. The typification of several names of southern Australian taxa is discussed and two are newly lectotypified.

Methods

Most measurements are from dried herbarium specimens which are also the prime source of data on habitat, distribution and phenology, as well as bark morphology and flower colour. Head diameter is measured, as indicated in the descriptions, from either fresh or dried material; it includes the stamens. As we use the term 'pungent' it refers to a phyllode apex that is drawn-out into a hard, spine-like tip;

'sharply pungent' refers to one that readily pierces the skin when touched and 'coarsely pungent' to one that is less sharp.

Our approach to typification is discussed elsewhere (Maslin & Cowan 1994b). The taxa are arranged in alphabetical order.

Taxonomy

Acacia cavealis R.S. Cowan & Maslin, *sp. nov.*

Frutex humilis, \pm viscidus, 0.3–0.7(1) m altus, 0.5–1.3 m expansus. Cortex cinereus, levis praeter basim exasperatus. Ramuli arachnoideo-tomentulosi sed pubibus implicitis. Stipulae persistentes, anguste triangulares ad subulatae, 0.75–2.2 mm longae. Phyllodia linearia, plana ad subteretia, abrupte obtusa et mucronato-pungentia, 10–35 mm longa, 1–1.8 mm lata, ratione horum 14–23, subrigida, patentia ad ascendentia praeter aliquando \pm reclinata, inter nervos initio arachnoideo-tomentulosa sed \pm glabrescentia, nervis principalibus 8 parallelis valde elevatis, glande inconspicua, 1.5–2.5 mm super basem. Pedunculi 7–12 mm longi, 2 in quoque axilla, glabri vel sparse minuto puberuli. Capitula globularia, aurea, 3.5–5 mm diam., floribus (9)12–18. Flores pentameri. Sepala longitudine 1/3–2/3 petali partes aequantia, discretata, spatulata ad spatulato-linearata, ciliata. Petala 1/2–3/4-connata, glabra. Legumen lineare, biconvexum sed non constrictum, 10–45 mm longum, 3–3.5 mm latum, lignosum, arcuatum, minute puberulum vel glabrum, secus suturas resinosa, cinereo-brunneum. Semina longitudinalia, late ellipsoidea, 2.5 mm longa, 2 mm lata, maculata, arillo subterminali, galeato.

Typus: Arrowsmith Lake, Western Australia, 9 December 1974, A.S. George 12933 (*holo:* PERTH 00197734; *iso:* CANB).

Sprawling, prostrate or low-domed *shrub* 0.3–0.7(1) m tall, 0.4–1.3 m across, sparingly branched at ground level. *Bark* light grey, smooth except roughened at base of stems. *Branchlets* terete, very obscurely ribbed, straight, arachnoid-tomentulose with the hairs embedded in resin and thus superficially appearing glabrous. *Stipules* narrowly triangular to subulate, 0.75–2.2 mm long, straight, acuminate, persistent. *Phyllodes* solitary or clustered in groups of 2 or 3(4), linear, flat to almost terete, 10–35 mm long, 1–1.8 mm wide, l:w 14–23, slender, rigid to subrigid, patent to ascending, some somewhat reclined, straight or rarely shallowly incurved, arachnoid-tomentulose between nerves at first but hairs obscured by resin, becoming glabrous (or apparently so) with age, green or sometimes grey-green; *longitudinal nerves* 8, not overly prominent, 3 per face when phyllode is flat; *apex* abruptly narrowed to a short, rigid, slender, pungent point; *pulvinus* 0.3–1 mm long, yellow to light orange but ageing brown. *Gland* inconspicuous, on upper margin of phyllode 1.5–2.5 mm above pulvinus, widely elliptic or circular with the rim raised. *Inflorescences* simple, 2 per axil; *peduncles* 7–12 mm long, glabrous; *basal peduncular bracts* similar to stipules but slightly smaller. *Heads* globular, pale yellow to light golden, 3.5–5 mm diam., (9)12–18-flowered; bracteoles \pm fusiform, ciliate. *Flowers* 5-merous; *sepals* 1/3–2/3 as long as petals, free, spatulate to narrowly spatulate, ciliate; *petals* widely elliptic, 1/2–3/4-united, glabrous, usually distinctly uninerved. *Ovary* villous, appressed-puberulous or glabrous. *Pods* linear, biconvex, not constricted between seeds, 10–45 mm long, 3–3.5 mm wide, coriaceous to subwoody, shallowly to moderately curved, very finely longitudinally nerved, minutely puberulous or glabrous, resinous, red-brown to dark brown, the marginal nerves thick, paler, the valves often persisting on plants into next season. *Seeds* longitudinal, widely ellipsoid, 2.5 mm long, 2 mm wide, 1.5–2.5 mm thick, dull, mottled brown on pale brownish grey; *pleurogram* U-shaped; *areole* small, c. 1/5 as long as seed, strongly raised; aril clavate, (?)white or cream.

Selected specimens examined. WESTERN AUSTRALIA: Watheroo, *L. Diels* 2129 (PERTH); 16 km S of Carnamah on Eneabba No. 1 Road, *S.J. Forbes* 1777 (MEL, PERTH); 23 miles [36.8 km] N of Mingenew, *A.S. George* 9212 (PERTH); Reserve 29073, 5 km N of Lake Indoon, W of Eneabba, *E.A. Griffin* 2852 & *M.I. Blackwell* (K, PERTH); Mudge Rd, N of Launer Rd, W of Coorow, *E.A. Griffin* 8176 (PERTH); 8 miles [12.8 km] W of Mullewa towards Geraldton, *B.R. Maslin* 69 (PERTH); Brand Hwy, 39.5 km S of intersection with The Midlands Rd (between Eneabba and Dongara), *B.R. Maslin* 5157 (CANB, NY, PERTH); 2 km from Ajana-Kalbarri road on track to Hawks Head Lookout, Murchison River, *B.R. Maslin* 5159 (PERTH); Indarra Springs reserve, SW of Mullewa, *B.R. Maslin* 7039 (PERTH).

Distribution. Occurs in the south-west of Western Australia from the Emu Proof Fence (north of the lower Murchison River) south to Watheroo.

Habitat. Grows in sand in heath, shrubland, low open woodland in sand or on lower slopes of sand ridges, especially with *Banksia prionotes* or scattered *Eucalyptus todtiana*.

Phenology. Flowering recorded from October to February and April to June; mature pods collected from September to December.

Conservation status. Not under threat.

Etymology. The seeds of *A. cavealis* are borne in discrete, elliptic-oblong chambers in the pods and it is this characteristic that gives the species its name, an adjectival form of *cavus*, Latin for hollow or hole, with the meaning 'kept in a cave or cellar'.

Affinities. The new species appears to be related most closely to *Acacia ridleyana* W. Fitzg., which differs most obviously in its broader (2–3.5 mm wide), normally shallowly sigmoid and hirsutellous to pubescent phyllodes (occasional glabrous or straight-phyllode variants occur in *A. ridleyana*). It also superficially resembles *A. auronitens* Lindl. and *A. quadrisulcata* F. Muell. The first of these has phyllodes 4-nerved in all (1-nerved per face when flat), frequently spinose stipules and crustaceous to woody pods with transverse seeds. The quadrangular, 4-nerved phyllodes and longitudinal to transversely oriented seeds of *A. quadrisulcata* readily separate this species from *A. cavealis*.

Notes. The indumentum of the branchlets especially is not at once obvious because it is covered and obscured by a layer of a water-imbibing resin. If a branchlet is soaked in water, the resin swells into a slimy, gelatinous coating so that the stem appears several times its true diameter; much the same sort of reaction occurs on the phyllodes but less obviously so. We have no explanation for the condition and cannot even advance an hypothesis to explain the purpose of such an evolutionary innovation.

Acacia chapmanii R.S. Cowan & Maslin, *sp. nov.*

Frutex compactus, 0.5–2 m altus. Ramuli teretes, glabri, saepe pruinosi. Stipulae indurato-spinosae vel tenues et subulatae, 0.8–3 mm longae. Phyllodia subulata, sessilia, saepe continua, pungentia, (17)20–30(48) mm longa, 0.7–1 mm diam., rigida, glabra, saepe pruinosa, nervis 8, elevatis, distantibus. Pedunculi solitarii, plerumque 10–15 mm longi, filiformes, glabri; bractae basales 2, semicirculares, cucullatae, c. 1.5 mm longae, glabrae, aliquando pruinosae. Capitula globosa, aurea, 4–5 mm diam., floribus 14–27. Flores 5-meri. Sepala discreta, spathulata vel anguste spathulata, ± puberula. Petala discreta, glabra. Legumen (subsp. *chapmanii*) lineare, torsivum, 20–40 mm longum, 2.5–3 mm latum,

aliquando pruinose. Semina longitudinalia, late ellipsoidica, 2.5–3 mm longa, 1.5–2 mm lata, nitida, maculosa.

Typus: near Three Springs [precise locality withheld for conservation reasons], Western Australia, 1 September 1976, B.R. Maslin 4277 (*holo*: PERTH 00197238; *iso*: BRI, CANB, K, MEL, MO, NSW, NY).

Harsh, dense, intricately branched *shrub* 0.5–2 m tall, 1–3 m wide, compact and \pm rounded in open, exposed sites, somewhat spindly in dense scrub, few–many-branched at ground level. *Bark* grey, fibrous and fissured on main stems, smooth on branches. *Branchlets* terete, glabrous, often lightly pruinose at ribbed tips. *New shoots* purple-red and pruinose. *Stipules* rigid and spinose or thin and subulate, 0.8–3 mm long, straight, glabrous, pungent or not, persistent. *Phyllodes* acicular, normally continuous with branchlets but not forming cauline wings, sessile, terete to flat, (17)20–30(50) mm long, 0.7–1 mm diam., rigid, patent to strongly reflexed or ascending, straight or shallowly recurved, glabrous, green to subglaucous (conspicuously glaucous when young); *longitudinal nerves* 8, 3 per face when flat, prominent, raised (at least when dry), narrow and with a distant inter-space between each nerve; *apex* narrowed to a straight, rigid, sharply pungent brown point; *pulvinus* absent. *Gland* not prominent, on upper surface of phyllode either near base or around middle and located below junction of 2 adaxial nerves, sometimes absent. *Inflorescence* simple, 1 per axil; *peduncles* (8)10–15(20) mm long, glabrous; *basal bracts* 2, persistent, semicircular, cucullate, *c.* 1.5 mm long, glabrous, dark, sometimes pruinose, one larger bract subtending peduncle, the other smaller one subtending a vegetative bud. *Heads* globular, prolific, bright light golden, 4–5 mm diam. (dry), 14–27-flowered; *bracteoles* spatulate, acute or obtuse, about same size and shape as sepals or much broader, exerted or not in mature buds. *Flowers* 5-merous; *sepals* 1/2 length of petals, free, spatulate or narrowly spatulate, \pm puberulous; *petals* narrowly elliptic to oblanceolate, free, glabrous. *Ovary* glabrous. *Pods* (typical subspecies only) narrowly oblong to linear, rounded over seeds but not or scarcely constricted between, 20–40 mm long, 2.5–3 mm wide, strongly curved to openly once-coiled, glabrous, brown (purplish when very young), lightly pruinose, firmly chartaceous. *Seeds* longitudinal, widely ellipsoid, 2.5–3 mm long, 1.5–2 mm wide, shiny, mottled dark brown and yellowish brown; *areole* minute; *funicle* filiform and short, the thickened aril \pm clavate, not folded, extending 1/2–2/3 down one side of seed.

Etymology. The species is named for Charles Chapman (1904–1988), a farmer who lived near Winchester, Western Australia, and became interested in the local flora, especially those he did not recognize. He collected extensively in the Coorow area and across to Green Head and made the first collections of this and other new species.

Affinities. *Acacia chapmanii* is allied most closely to *A. campylophylla* Benth. which is distinguished by its generally shorter (10–20 mm long), strongly recurved phyllodes and by its straight, broader pods (4–7.5 mm wide) containing transverse seeds (but note that mature pods are unknown for *A. chapmanii* subsp. *australis*.) *Acacia campylophylla* has a scattered distribution from Bolgart (within the range of *A. chapmanii* subsp. *australis*) and Wyalkatchem south to near Corrigin. *Acacia chapmanii* has a superficial resemblance to *A. subsessilis* A.R. Chapman & Maslin (Chapman & Maslin 1999) and *A. wilsonii* R.S. Cowan & Maslin (Cowan & Maslin 1999).

Subspecies. There are two geographically disjunct subspecies – subsp. *chapmanii* and subsp. *australis*. It is possible that future studies may show that these subspecies would be better treated as distinct species, but because pods are not known for the latter an informed decision on this matter cannot be made now.

Key to subspecies of *Acacia chapmanii*

- Phyllodes terete, patent to reflexed, straight; stipules spinose
(Marchagee to Three Springs) subsp. **chapmanii**
- Phyllodes subterete to flat, ascending, shallowly recurved; stipules
not spinose (Calingiri to Bolgart) subsp. **australis**

Acacia chapmanii* R.S. Cowan & Maslin subsp. *chapmanii

Stipules 1.5–3 mm long, rigid and spinose. *Phyllodes* terete, straight, patent to reflexed. *Gland* 0.5–3 mm above phyllode base, commonly absent. *Heads* 14–19-flowered; *bracteoles* insignificant, the small lamina about same width as the sepals.

Selected specimens examined. WESTERN AUSTRALIA, [precise localities withheld for conservation reasons]; near Three Springs, 17 June 1977, *C. Chapman s.n.* (CANB, PERTH00197319), W of Three Springs, *B.R. Maslin* 3062 (CANB, MEL, PERTH); near Marchagee, *B.R. Maslin* 5305 (K, PERTH); SW of Three Springs, *B.R. Maslin* 6413 (PERTH); Marchagee Track, *D. Papenfus* DP 539 (PERTH).

Distribution. Occurs in the south-west of Western Australia from near Three Springs south to near Marchagee.

Habitat. Grows in laterite or gravel over clay-loam or yellow sand, sometimes on saline flats, in scrub or heath with *Banksia*, *Allocasuarina*, *Xylomelum* and *Verticordia*.

Phenology. Flowers in September–October; mature pods collected in late November and December.

Conservation status. CALM Conservation Codes for Western Australian Flora: Priority Two.

Acacia chapmanii* subsp. *australis* R.S. Cowan & Maslin, *subsp. nov.

Ab *Acacia* subsp. *chapmanii* phyllodiis ascendentibus, leviter recurvatis, glande 4–9 mm supra basin inserta; stipulis c. 1 mm longis subulatis sed not rigidis; pedunculis 12–19 mm longis; capitulis 5 mm diam., floribus 24–27; bracteolis quam sepalis latioribus, ad 0.75 mm latis, laminis acutis in alabastro ± exsertis, differt.

Typus: near Bolgart [precise locality withheld for conservation reasons], Western Australia, 15 September 1972, *H. Demarz* D.3920 (*holo:* PERTH 00197289; *iso:* CANB, K).

Stipules c. 1 mm long, not at all rigid, subulate. *Phyllodes* subterete to flat, ascending, shallowly recurved; gland 4–9 mm above base. *Peduncles* 12–19 mm long. *Heads* 5 mm diam., 24–27-flowered; *bracteoles* evident in mature buds, the comparatively large lamina much broader than the sepals, to 0.75 mm wide. Mature pods and seeds not seen.

Selected specimens examined. WESTERN AUSTRALIA, all near Bolgart [precise localities withheld for conservation reasons]; *R.J. Cranfield* 8364 & *P. Spencer* (PERTH); *P. Hussey* 6 (PERTH); *D. Papenfus* DP 119 (PERTH); *S. Paust* 1005 (PERTH).

Distribution. Occurs in the south-west of Western Australia near Bolgart.

Habitat. Grows in brown, grey or white sand or gravel in winter-wet low heath.

Phenology. Flowering recorded in August and September; mature pods not collected, but specimens with immature pods have been collected in October and November.

Conservation status. CALM Conservation Codes for Western Australian Flora: Priority Two.

Etymology. The subspecific name *australis* (southern) refers to the more southerly distribution of this taxon relative to the typical subspecies.

Affinities. Subsp. *australis* has a superficial resemblance to the more southerly distributed *A. acellerata* Maiden & Blakely which occurs between Cranbrook and Ravensthorpe and is most readily distinguished by its 16-nerved phyllodes that are not continuous with the branchlets, paired peduncles and undulate pods.

Acacia colletioides Benth., *London J. Bot.* 1: 336 (1842). *Type:* Harrington plains, New South Wales, [June 1817], *A. Cunningham* [405/1817] (*holo:* K; *iso:* BM, K).

Acacia nyssophylla F. Muell., not as to lectotype, as to Lake Gairdner, South Australia, *B.H. Babbage* (*paralecto:* MEL, PERTH – fragment ex MEL).

Typification. At the Royal Botanic Gardens, Kew, there are two sheets with type material of the name *A. colletioides*. One bears a single branchlet and a label in neither Bentham's nor Cunningham's hand, giving the type locality, June 1817 as the collection date, and 405 as Cunningham's collection number. The other sheet bears three branchlets: one (upper left) has a field label '405/1817'; the second (lower left) has no label and may be a second piece of the one above; the third is separated by a pencil line and has a field label in Cunningham's hand but with neither date nor collection number. In December 1966, A.B. Court studied these materials and labelled the third specimen (just cited) as the holotype and all the others on both sheets as isotypes. We accept his determination.

Acacia donaldsonii R.S. Cowan & Maslin, *sp. nov.*

Frutex vel arbor 1.5–5 m alta. Ramuli teretes, dense puberuli, demum resinosi. Stipulae persistentes, anguste triangulares, c. 0.5 mm longae. Phyllodia teretia, pungentia, pulvino indistincto, versus basem expanso, 1–2 mm longo, dense puberulo et albo-resinoso, lamina 6–14.5 cm longa, 1.5–2.5 mm diam., rigida, ascendenti ad erecta, parce appresso-puberula sed glabrescenti, nervis 4–8, ± distinctis, immersis vel leviter elevatis; glandulae 2, minutae. Pedunculi 5–7 mm longi, in quoque axilla vulgo binati, appresso-puberuli. Capitula globularia, aurea, 4–5 mm diam., floribus 30–56, bracteolis spatulatis. Flores 5-meri. Sepala petalis dimidio breviora, 2/3–3/4-connata, ± puberula. Petala glabra. Ovarium dense albo-puberulum. Legumen compresso-moniliforme vel anguste oblongum, biconvexum, 7.5–14 cm longum, 7–10 mm latum, rigido-coriaceum, arcuatum. Semina longitudinalia, ellipsoidea ad obloideo-ellipsoidea, 6.5–9 mm longa, 4.5–5.5 mm lata, hebetato-brunnea, distincte alveolata, pleurogramma 4–5 mm longa, impressa, arillo carnosio, terminali.

Typus: 3 km north-east of No. 1 Well, Weebo Station, Western Australia, 9 June 1988, *R.J. Cranfield* 6938 (*holo:* PERTH 01060635; *iso:* CANB, K, NY).

Bushy or compact *shrub* to \pm gnarled *tree* 1.5–3(5) m tall, 1–4 m across, with several trunks to 10 cm diam. *Bark* smooth or \pm tessellated, grey. *Branchlets* terete, very obscurely ribbed, densely minutely puberulous at first, resinous (but not viscid), scarred by raised projections where phyllodes have fallen. *Stipules* narrowly triangular, c. 0.5 mm long, persistent. *Phyllodes* terete, 6–14.5 cm long, 1.5–2.5 mm diam., rigid, ascending to erect, straight to gently incurved, sparingly appressed-puberulous at first, glabrescent except pulvinus, the surface often microscopically pitted, light green; *apex* tapered to a straight, rigid, dark, pungent tip; *pulvinus* indistinct, expanded towards base, 1–2 mm long, densely puberulous, white-resinous; *longitudinal nerves* 4–8, rather obscure, immersed to very slightly raised with distinct inter-nerve spaces between. *Glands* 2 on upper surface of phyllode, minute, the lower 1–14 mm above phyllode base, the upper 4–40 mm below apex. *Inflorescences* simple, 2 or more per node; *peduncles* 5–15 mm long, appressed-puberulous; *basal bracts* broadly ovate, appressed-puberulous. *Heads* globular, golden, 4–5 mm diam., 30–56-flowered; *bracteoles* spatulate, somewhat puberulous, the widely elliptic lamina ciliolate. *Flowers* 5-merous, rarely 6- or 7-merous; *sepals* 1/2 petal length, 2/3–3/4-united, puberulous, obtuse to acute, ciliolate; *petals* free, glabrous. *Ovary* densely white-puberulous. *Pods* moniliform to linear, slightly to prominently raised over seeds and scarcely to markedly constricted between, 7.5–25 cm long, 6–10 mm wide, coriaceous, the crustaceous exocarp fragmenting and falling away after dehiscence, curved, the valves twisted after dehiscence, glabrous, dark brown to red-brown, ageing blackish. *Seeds* longitudinal, ellipsoid to obloid-ellipsoid, 6.5–9 mm long, 4.5–5.5 mm wide, 2.5–3 mm thick, dull, brown, minutely rugulose; *pleurogram* open at hilar end; *areole* 4–5 mm long, 2 mm wide; *aril* fleshy, clavate to sub-hemispherical, relatively small.

Selected specimens examined. WESTERN AUSTRALIA: Lake Lefroy, *M. Donaldson* K50(b) (CANB, PERTH); Hogans Lagoon on E end of Lake Lefroy, *M. Donaldson* K50(c) (PERTH); NE end of Lake Cowan near Binneringie Homestead, *M. Donaldson* K50(d) (AD, NSW, PERTH); Jubilee [Lake], 1 Aug. 1966, *J. Lowry s.n.* (PERTH); Goddard Dam, just below SW extremity of Lake Yindarlgooda, c. 40 km due ESE of Kalgoorlie, *B.R. Maslin* 6018 (MEL, PERTH); 75 km ENE of Paynes Find on road to Sandstone, c. 1.75 km N of turn off to Narndee Station, N of Road Bore (Well), *F.H. Mollemans* 4238 (PERTH); near Red Bluff, Narndee Station, *A.L. Payne* 3468 (PERTH); 22.5 km NW of Queen Victoria Spring, *D.J. Pearson* DJP 3116 (CANB, PERTH); 1 km SW of Errol's Brook, Cogla Downs [Station], *H. Pringle* 3640 (PERTH).

Distribution. Scattered in the goldfields of Western Australia from between Paynes Find and Cue east to Jubilee and Carlisle Lakes in the Great Victoria Desert and south to Kalgoorlie and Norseman.

Habitat. Grows in pale brown or orange sand, clay or loam with quartzite gravel on saline flats or breakaways in mallee shrubland.

Phenology. Flowering recorded from April to September; mature pods collected in November, December, March and April.

Conservation status. Not under threat.

Etymology. The new species is named for Michael Donaldson, who was a mining engineer working near Kalgoorlie, Western Australia, when he first brought the plant to our attention in early 1988; since then he has made several additional collections over a wide range. His efforts have made this description possible and we are pleased to recognize and applaud his interest.

Affinities. *Acacia donaldsonii* is superficially very similar to, and could easily be confused with, *A. gilesiana* F. Muell. but these two species may not be particularly closely related. *Acacia gilesiana* occurs mainly in the Gibson and Great Victoria Deserts and is easily recognized by its glabrous branchlets and peduncles, well-developed racemes, innocuous to coarsely pungent phyllodes, peltate bracteoles, glabrous ovary and non-arillate seeds. *Acacia donaldsonii* also has a superficial resemblance to *A. kalgoorliensis* R.S. Cowan & Maslin which has smaller phyllodes (2.5–7 cm long, c. 1.5 mm diam.) with more numerous, more obvious nerves (stomata evident at x10 magnification in the inter-nerve spaces); it also has free sepals. In the same general area that *A. donaldsonii* occurs, there is another species with rigid, ascending, pungent phyllodes – *A. masliniana* R.S. Cowan which has much more slender phyllodes (1–1.5 mm diam.) with numerous, fine, closely spaced longitudinal nerves, shorter peduncles (0.5–3 mm long) and narrower pods (3–4.5 mm wide).

Acacia formidabilis C.A. Gardner ex R.S. Cowan & Maslin, *sp. nov.*

Frutex diffusus 0.25–0.6 m altus. Ramuli pilosi ad appresso-pilosi. Stipulae persistentes, recurvo-spinosae, 1.5–3 mm longae. Phyllodia plana, ± inaequaliter anguste elliptica vel oblongo-lanceolata, longo-acuminata, pungentia, pulvino c. 0.5 mm longo, lamina 13–25 mm longa, 2.5–4 mm lata, rigido-coriacea, patenti ad ascendenti, recurvata, glabra, glauca, multinervata, nervis arcte parallelis prominulis, solum leviter elevatis, glandulis 2. Pedunculi binati, 4–10 mm longi, parce pilosi ad glabri, interdum glauci, bracteis basalibus persistentibus, crassis, late ovatis, acutis, cucullatis appresso-puberulis, interdum glaucis. Capitula globularia, pallido-aurea vel atro-aurea, 4–5.5 mm diam., floribus 31–52; bracteolae spathulatae, ± puberulae ciliataeque, acutae ad acuminatae, in alabastro exsertae, atro-brunneae. Flores 5-meri. Sepala petalis 1/2–2/3 breviora, discreta ad 1/2-connata, linearia ad anguste spathulata. Petala 2/3-connata, glabra. Ovarium glabrum. Legumen planum, orbiculare ad late oblongo-ellipticum, supra semina elevatum, 12–18 mm longum, 12 mm latum, chartaceum, subtiliter reticulatum, glabrum, interdum resinolum, nervis marginalibus crassis cum reticulo interconjugatis. Semina transversa, ovoidea, c. 2.5 mm longa, 1.8–2 mm lata, maculata cum luteo-brunnea et atro-brunnea; arcola minuta, umbonata, exarillata.

Typus: 6 miles [9.6 km] north-west of Southern Cross towards Bullfinch, Western Australia, 12 August 1971, B.R. Maslin 1956 (*holo:* PERTH 00196819; *iso:* CANB, K, NY).

Diffuse *sub-shrub* 0.25–0.6 m tall, 0.3–0.5 m wide. *Branchlets* terete, densely pubescent (hairs spreading to appressed). *Stipules* persistent, recurved-spinose, 1.5–3 mm long, ± appressed-puberulous, glabrescent, arising from two sides of stem projections bearing phyllodes. *Phyllodes* ± unequally narrowly elliptic or oblong-lanceolate, commonly the upper margin ± shallowly convex and the lower margin straight to shallowly concave, 13–25 mm long, 2.5–4 mm wide, rigid, coriaceous, patent to ascending, often shallowly recurved, glabrous, glaucous or pale green; *apex* long-acuminate, ending in a straight, rigid, brown, pungent point; *pulvinus* c. 0.5 mm long; *longitudinal nerves* numerous, fine, close together, not anastomosing. *Glands* 2, on upper margin of phyllode about 1/3 and 2/3 of phyllode length above pulvinus, small, inconspicuous. *Inflorescences* simple, 2 per axil; *peduncles* 4–10 mm long, sparingly puberulous or glabrous, sometimes pruinose; *basal bracts* persistent through anthesis, thick, broadly ovate, acute, cucullate, appressed-puberulous, sometimes pruinose. *Heads* globular, pale golden to deep golden, 4–5.5 mm diam., 31–52-flowered; *bracteoles* spathulate, ± puberulous, ciliate, exserted in buds, dark brown, the lamina widely elliptic, ovate or lanceolate, concave, acute to acuminate. *Flowers* 5-merous; *sepals* 1/2–2/3 length of petals, free to 1/2-united, linear to narrowly spathulate, ± puberulous and ciliate; *petals* ± oblanceolate, acute, recurved or the tip incurved, 2/3-united, glabrous. *Ovary* glabrous. *Pods* flat, orbicular to oblong-elliptic, raised over seeds along midline, 12–18 mm long, 12 mm wide, papery, straight, glabrous, sometimes resinous, light brown,

obscurely transversely reticulate; marginal nerves slightly thickened. *Seeds* transverse, ovoid, c. 2.5 mm long, 1.8–2 mm wide, 1.2–1.4 mm thick, dull, mottled dark brown on pale brown; *pleurogram* U-shaped, open at hilar end; *areole* minute, 0.2–0.3 mm long, pale; *aril* absent.

Selected specimens examined. WESTERN AUSTRALIA: 3 miles [4.8 km] S of Paynes Find on Great Northern Highway, *I.B. Armitage* 411 (PERTH); 10 miles [16.6 km] N of Warralakin, NE of Merredin, *J.S. Beard* 4742 (PERTH); Whitewells near Ninghan, *C.A. Gardner* 12500 (PERTH); 4 km WSW of Paynes Find on Great Northern Highway, *A.S. George* 14276 (PERTH); 16 km NE of Bungalbin Hill, c. 62 km NNE of Koolyanobbing, *K. Newbey* 10832 (PERTH); 3 miles [4.8 km] W of Paynes Find on [Great Northern] Highway, *R.A. Saffrey* 849 (G. MEL, PERTH).

Distribution. Occurs in the south-west of Western Australia, scattered from near Perenjori and Paynes Find, south-east to Southern Cross.

Habitat. Grows in sand on plains and hillsides in tall open shrubland, sometimes associated with *Banksia elderiana*, *Eucalyptus leptopoda* or *Triodia* sp.

Phenology. Flowering recorded from July to September; mature pods collected in November.

Conservation status. CALM Conservation Codes for Western Australian Flora: Priority Three.

Etymology. The specific epithet, from the Latin *formidabilis* (causing fear, terrible), was chosen by the late Charles Gardner for his collection 12500 but not published by him; it refers to the spinescent stipules and long-cuspidate, pungent phyllodes.

Affinities. Phyllodes of *A. formidabilis* closely resemble those of *A. resinistipulea* W. Fitzg. which is a taller shrub (1.5–3 m high) with non-spinose stipules, shorter peduncles (3–4 mm long) and fewer-flowered heads (23–25-flowered). *Acacia resinistipulea* occurs sporadically from Yellowdine (just east of Southern Cross) and Coolgardie south-east to near Balladonia; until pods are collected from this species it is not possible to determine how closely related it is to *A. formidabilis*. The new species is sometimes superficially similar to *A. unguicula* R.S. Cowan & Maslin which is a taller plant (1–3 m) with nearly glabrous branchlets, more prominent, yellowish phyllode nerves with stomata on the green, inter-nerve region, and linear pods c. 2 mm wide. *Acacia unguicula* is known only from Ninghan Station, between Wubin and Paynes Find.

Acacia havilandiorum Maiden, *J. & Proc. Roy. Soc. New South Wales* 53: 182 (1920), as *A. havilandi*. *Type*: 'Wong Suey's [Suie's] Paddock', Cobar, New South Wales, September 1917, *E. Haviland s.n.* (*lecto*: NSW, flowering specimen, here selected; *isolecto*: K, NSW, PERTH 00954977); 'Wong Suey's Paddock', Cobar, New South Wales, November 1917, *E. Haviland (paralecto*: K, NSW, PERTH 00954969).

Typification. Two collections, one flowering (September), the other fruiting (November), were cited by Maiden in his protologue. Although both represent the same taxon, in order to avoid possible later complications the flowering specimen at NSW is chosen as the lectotype; a duplicate of each collection is at PERTH through the generosity of NSW. The type locality was spelled 'Wong Suey's' in Maiden's publication but on the labels it is spelled 'Wong Suie's'. The original spelling of the epithet was 'havilandi?'; the change to 'havilandiorum' recognizes the author's stated intention to honour both the Rev. Haviland and his son, both of whom were avid plant collectors (Hall & Johnson 1992).

Acacia latipes Benth., *London J. Bot.* 1: 334 (1842). *Type:* Swan River, Western Australia, *J. Drummond s.n. (holo: K)*.

Acacia striatula Benth., *London J. Bot.* 1: 336 (1842). *Type:* Swan River, Western Australia, *J. Drummond s.n. (holo: K)*.

Acacia latipes Benth. var. *pubescens* Meisn. in J.G.C. Lehmann, *Pl. Preiss.* 1: 10 (1844), *synon. nov.* *Type:* Quangen [near Wongamine, E of Toodyay, c. 31°29'S, 116°37'E], Western Australia, 20 March 1840, *L. Preiss 989 (lecto: NY, fide Maslin & Cowan (1994a); isolecto: LD)*.

Affinities. *Acacia latipes* is most closely related to *A. cochlearis* (Labill.) H. Wendl. Together with another closely related species-pair – *A. comans* W. Fitzg. and *A. adnata* F. Muell. – they comprise the informal *Acacia latipes* group. These four species are characterized by having flat, sessile, pungent phyllodes with 3 or 4 longitudinal nerves on each face, free sepals, united petals and linear pods. In the past there has been much confusion between the species of each pair and this has led to difficulties in applying the names.

Key to species of the *Acacia latipes* group

- 1 Stipules persistent, more or less spinose
 - 2 Branchlets and pods with spreading hairs **A. comans**
 2. Branchlets and pods with appressed hairs (or pods glabrous) **A. adnata**
1. Stipules caducous, not at all spinose
 - 3 Phyllodes thinly coriaceous to subrigid, the nerves plane or slightly to moderately raised, the base narrowed (base normally much narrower than mid-section of phyllode); plant mainly of coastal sand **A. cochlearis**
 3. Phyllodes rigid to thick-rigid, the nerves moderately to strongly raised, the base not or ± scarcely narrowed (base more than half as wide as mid-section of phyllode); plant of near-coastal and inland areas **A. latipes**

Affinities. Although the above differences between *A. latipes* and *A. cochlearis* are relatively subtle, each species tends to have its own distinctive facies and specimens can generally be assigned to one or the other. Because the flowers and fruits of *A. latipes* and *A. cochlearis* are very similar, it is the highly variable phyllodes that are the main source of characters for distinguishing the two species. Even so, particular problems occur with plants having very narrow phyllodes (11–26 times longer than wide) which occur scattered along the south coast between Albany and Madura and adjacent inland areas in places. Some of these plants show enough of the characteristics of *A. cochlearis* to be assignable with confidence to that species; others approach *A. latipes* so closely that to assign them to either species is difficult. It is conceivable that, in at least some instances, the collections are from hybrid populations but we have no firm data to support such an hypothesis. Future in-depth studies will have to determine, more precisely than we have time to do, whether *A. cochlearis* and *A. latipes* are, in fact, infraspecific parts of a single taxon. We leave our preliminary studies of the two species with the distinct impression that we may have been trying to dissect a variation continuum.

The typical variant of *A. cochlearis* has a discontinuous distribution along the coast of south-west Western Australia from Laneclin (north of Perth) to the mouth of the Donnelly River, from Albany to Hopetoun, and from Esperance to south-east of Madura; this variant extends inland only at the Porongurup Range, north of Albany. Variants of *A. cochlearis* with narrow phyllodes occur scattered

along the south coast of Western Australia between Albany and Israelite Bay, extending inland to near Katanning, the Newdegate–Lake King area, and near Clyde Hill, north-east of Esperance. *Acacia latipes* has a generally more northerly or more inland distribution compared to that of *A. cochlearis* (see below).

Variation. *Acacia latipes* exhibits a perplexing range of variation, particularly in regard to phyllode morphology. Of the many variants that can be recognized from an examination of herbarium material we consider it prudent at this stage to formally recognize only one, subsp. *licina*, characterized by its exceedingly long phyllodes. The typical subspecies therefore remains broadly circumscribed and it has not been possible within the scope of the present study to undertake the considerable field and laboratory work needed to elucidate these patterns of variation. At least ten variants can be recognized within this subspecies.

The principal impression gained by our study of the available material attributed to *A. latipes* is variability in all respects, but a few tentative observations are worth recording.

1. Indumentum alone is not correlated with any other characteristic. Northern populations have puberulous branchlets and/or phyllode nerves more often than do those to the south. The type of *A. latipes* var. *pubescens* Meisn. was collected by Preiss in the Victoria district of Western Australia, east of Toodyay; this variant is not worthy of formal recognition.
2. We have not been able to identify any modern collection that precisely corresponds to the type of *A. striatula* Benth., although some are fairly close to it. It is characterized by unusually small, straight or recurved, linear phyllodes and appressed-puberulous branchlets. These characters seem hardly to justify its separation at any level and accordingly for the present we treat *A. striatula* as conspecific with *A. latipes*.
3. Plants with the longest peduncles and heads with the largest number of flowers occur in the northern part of the range.
4. We cannot over-emphasize the importance of extensive, intensive field studies from Shark Bay to Esperance for the further refinement of our, admittedly, broad treatment of *A. latipes*.

Key to subspecies of *Acacia latipes*

Phyllodes straight to shallowly recurved, narrowly oblong-elliptic to widely elliptic, subtriangular, linear or subulate, mostly 3.5–8 times longer than wide, often glaucous or subglaucous subsp. **latipes**
 Phyllodes normally curved upwardly, rarely straight, elongate-linear, 23–40 times longer than wide, not glaucous subsp. **licina**

Acacia latipes Benth. subsp. **latipes**

Phyllodes straight to very shallowly recurved, narrowly oblong-elliptic, elliptic, widely elliptic, subtriangular, linear or subulate, (7)11–25(40) mm long, (0.8)1.5–4(7) mm wide, (1.5)3.5–8(20) times as long as wide, commonly glaucous or sub-glaucous, occasionally pruinose.

Selected specimens examined. WESTERN AUSTRALIA: 40.7 miles [65.5 km] from [ENE of] Geraldton (W of Indarra), *A.M. Ashby* 3795 (AD, CANB, K, L, MEL, NSW, PERTH); 16 km N of Watheroo towards Three Springs, *B.R. Maslin* 3298 (CANB, PERTH); Lawnswood, between Toodyay and Clackline, *B.R. Maslin* 3387 (PERTH); c. 77 km due NE of Esperance, Parmango Rd, 16.5 km NE of Fisheries Road, *B.R. Maslin* 5833 (PERTH); c. 25 km WSW of York, Talbot Road West, 12.5 km SE of York–Perth road, *B.R. Maslin* 6171 (PERTH); c. 8 miles [12.9 km] N of Bulyee, *K. Newbey* 3424 (PERTH); 6.6 miles [10.6 km] S of Caltex garage, Coorow on Geraldton Highway, *M.D. Tindale* 2670 (PERTH); Hill River Spring, between Badgingarra and Jurien Bay, 8 Oct. 1961, *J.H. Willis s.n.* (PERTH).

Distribution. Occurs in the south-west of Western Australia from Hamelin Pool to Quairading with scattered populations from near Lake King to east of Scaddan.

Habitat. Grows in sand, sandy loam, loam and lateritic soil in heath (especially near the coast), shrubland, scrub and woodland of banksias, York Gum and Wandoo.

Phenology. Flowering recorded from May to October; mature pods collected from late November to January.

Conservation status. Not under threat.

Acacia latipes* subsp. *licina* R.S. Cowan & Maslin, *subsp. nov.

Ab *A. latipes* subsp. *latipes* phyllodiis rectis vel plerumque incurvatis, elongato-linearibus, 24–52 mm longis, 1–2 mm latis, ratione horum 23–40, differt.

Typus: 14.1 miles [22.6 km] south of Mullewa–Geraldton rail crossing on Erangy Springs road, Western Australia, 30 July 1972, *A.M. Ashby* 4622 (*holo:* PERTH 00714550; *iso:* CANB, K, NSW, NY, PERTH 00853372).

Phyllodes straight or more often incurved, elongate-linear, 24–52 mm long, 1–2 mm wide, 23–40 times as long as wide.

Selected specimens examined. WESTERN AUSTRALIA: 8 miles [12.9 km] along Casuarina Road, SE of Geraldton, *A.C. Burns* 5 (PERTH); 5 miles [8 km] N of Port Gregory–Northampton road towards Kalbarri, *R. Cumming* 1746 (PERTH); N of Eneabba, E of Brand Highway and 1.6 km W of intersection of Beekeepers Reserve Rd and railway line, *E.D. Kabay* 225 (PERTH); South Hutt River, *A. Oldfield s.n.* (PERTH 00714542); Erangy Springs road, 14 miles [22.5 km] S of 42 mile peg on Geraldton–Mullewa road, *G. Phillips* GP54 (DNA, PERTH); 8.5 miles [13.7 km] S of Geraldton–Mullewa rail crossing on Erangy Springs road *G. Phillips* for *A.M. Ashby* AMA4627 (MEL, PERTH).

Distribution. Occurs in the south-west of Western Australia from Port Gregory to north of Three Springs. A collection from Esperance (*C.A. Gardner* 1690) appears to have incorrect label data and it has not been possible to clarify the locality from his field books.

Habitat. Grows in sand and limestone in heath and low shrubland.

Flowering period. Flowering recorded in June and July. No mature pods seen.

Conservation status. CALM Conservation Codes for Western Australian Flora: Priority Three.

Discussion. Bentham (1864) referred an Oldfield collection from the 'South Hutt' [River], near Port Gregory, to his *A. striatula*; this collection represents the northern limit of *A. latipes* subsp. *licina*.

Etymology. Named from the Latin *licinus* (bent or turned upwards), in reference to the typical phyllode shape.

Acacia nyssophylla F. Muell., *nom. inval.*, *Fragm.* 4: 4 (1863); *Pl. Victoria* 2: 9 (1863), not effectively published, see Court *et al.* (1994). – *Acacia colletioides* var. *nyssophylla* (F. Muell.) Benth., *Fl. Austral.* 2: 326 (1864). *Type:* in the Desert on the River Murray, Victoria, *F. Mueller s.n.* (*lecto:* MEL 500592, here selected); *isolecto:* K, PERTH – fragment ex MEL); Lake Gairdner, South Australia, *B.H. Babbage* (*paralecto:* MEL, PERTH – fragment ex MEL [this collection is *A. colletioides* Benth.]).

Acacia periculosa S. Moore, *J. Linn. Soc. Bot.* 45: 171 (1920), *synon. nov.* *Type:* Nungarin, Western Australia, 1917, *F. Stoward* 753 (*holo:* BM).

Typification. When Mueller described *A. nyssophylla* he cited two collections in his protologue but one of them, *B.H. Babbage s.n.* from South Australia, is *A. colletioides*. As a consequence, we have chosen as the lectotype Mueller's own collection, which also agrees more closely with his protologue.

This binomial and others' are to be found in the broadsheets distributed by Mueller to a few friends of the first part of Volume 2 of his "The Plants Indigenous to the Colony of Victoria"; because only forty pages of the second volume were printed, apparently for economic reasons, and never properly distributed, Court *et al.* (1994) concluded that the work was not effectively published and the new names in it therefore invalid. In this instance the binomial dates from his slightly later publication in the second reference cited above.

Acacia speckii R.S. Cowan & Maslin, *sp. nov.*

Frutex fruticosus vel arbor parva 2–3 m alta. Phyllodia teretia, pungentia, (70)80–120 mm longa, 1–1.5 mm diam., recta ad leviter incurvata, glabra, subglauca, nerviis 8, distantibus, valde elevatis, glande 2–4.5 mm supra pulvinum, punctiformi, depressa, pulvino perbrevis. Pedunculi 5–10 mm longi (in fructo), 1 vel 2 in quoque axilla. glabri. Capitula probabiliter lato-ellipsoidalia ad obloidea. Flores 4-meri. Sepala et petala 1/4 connata, sepalis anguste oblongis. Legumen moniliforme, (30)70–135 mm longum, 4–6 mm latum, leviter curvatum, glabrum, valvis chartaceis. Semina longitudinalia, globosa, ad apicem umbonata, c. 5 mm diam., obscure brunnea, arillo minuto.

Typus: 16 miles [25.6 km] south-west of Nannine, Western Australia, 8 September 1957, *N.H. Speck* 718 (*holo:* PERTH 00196746; *iso:* CANB, K, NSW).

Bushy, multi-stemmed, obconic (crown rounded) *shrub* to c. 2 m tall, maturing to ± gnarled *tree* c. 3 m tall, single-stemmed or sparingly branched at ground level. *Bark* grey, fissured on main stems. *Branchlets* terete, finely ribbed, glabrous, grey. *New shoots* pale green. *Stipules* early caducous. *Phyllodes* terete, (70)80–120 mm long, 1–1.5 mm diam., rigid, erect, straight to shallowly incurved, often somewhat bent at the gland, glabrous, pale subglaucescent to light green; *longitudinal nerves* 8, prominent, raised, widely spaced with well-defined inter-nerve spaces; *apex* narrowed to a straight, rigid, brown, ± pungent point; *pulvinus* very short, yellow. *Gland* on upper surface of phyllode

2–4.5 mm above pulvinus, minute, punctiform, depressed. *Inflorescences* (judging from very young buds) simple, 1 or 2 per axil; *peduncles* 5–10 mm long (in fruit), glabrous, the receptacle (at fruiting) elongate, to c. 5 mm long; *basal bracts* cucullate, glabrous. *Heads* (judging from fruiting receptacles) broadly ellipsoid to obloid. *Flowers* 4-merous. *Pod* moniliform with rounded segments, (30)70–135 mm long, 4–6 mm wide; valves chartaceous, shallowly curved, light brown, glabrous. *Seeds* longitudinal, globose, ± equatorially ridged, umbonate at apex, c. 5 mm diam., dull, brown; *pleurogram* not evident; *aril* minute.

Selected specimens examined. WESTERN AUSTRALIA: 43.5 km W of Yalgoo towards Mullewa, B.R. Maslin 3621 (PERTH); 27 km W of Yalgoo towards Mullewa, B.R. Maslin 4259 (CANB, MEL, NSW, PERTH); 17 km due N of Mount Magnet, c. 5 km due NW of 'Baxter's Welcome' mine pit, B.R. Maslin 7340 (PERTH); Norie Station, A.A. Mitchell 979 (AD, BRI, G, PERTH); 10 km W of Coodardy Station homestead, A.A. Mitchell 1337 (PERTH); Gabanintha road, S of Meekatharra, N.H. Speck 891 (PERTH).

Distribution. Occurs in Western Australia, scattered from north-west of Meekatharra to Mount Magnet and south-west of Yalgoo, and towards Mullewa and Morawa.

Habitat. Grows in rocky granitic soil on slopes of low hills with underlying basalt, granite or dolerite, in shrubland or open scrub with *Acacia aneura*.

Fruiting period. Flowering season not known but mature pods collected in September.

Conservation status. CALM Conservation Codes for Western Australian Flora: Priority Three.

Etymology. The epithet acknowledges Nathaniel H. Speck (1906–1970) who discovered and first collected the species in 1957. See Hall (1984) for biographical notes.

Affinities. The relationship of this species to others is not clear but it may be related to *Acacia obtecta* Maiden & Blakely which is readily distinguished by its flat, innocuous phyllodes that are 4–6 mm wide and its exarillate seeds. *Acacia obtecta* occurs in the Paynes Find–Wubin–Kununoppin area.

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